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SOCIAL DIFFERENTIATION AND SOCIAL INTEGRATION.[1]

ORGANIC and superorganic processes are the same in principle, but different in method. Social evolution obeys the same general laws as organic evolution, but the mode of operation in each is so unlike that the general identity is difficult to recognize. So great is this difference that, in discussing the latter, biological terminology may be avoided and only sociological and anthropological terminology employed. The terms "differentiation" and "integration," however, though chiefly used in biological discussions, belong as properly to the other sciences and cannot well be dispensed with.

In the present state of science all considerations of man that involve his origin and development must necessarily start from the biological standpoint. The fundamental truth that man is a species of animal may be taken as established. It is therefore the human species, *Homo sapiens*, with which both the anthropologist and the sociologist have to deal. This species has descended from more remote animal ancestors in the same way that all other species now constituting the fauna of the globe have reached their present state. Whether it be Pithecanthropus or Homosimius that forms the latest link in the chain that leads back to Dryopithecus and earlier true simian forms is the taxonomic problem of the biologist. The anthropologist, and especially the sociologist, are concerned with the genus Homo and with what has taken place since that genus acquired its full standing as such.

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[1] From the *Annales de l'institut international de sociologie*, Vol. IX (1903), pp. 49–85.

Biologists are now practically unanimous in maintaining that every distinct species has developed through descent with modification under conditions that combined to produce that particular form. Such conditions can only exist in a definite and more or less limited territorial area. Each species is thus usually confined to such an area. If it has a wider distribution, the form is correspondingly varied, indicating dispersion subsequent to the time at which it attained its specific character at some one point or limited area. That this was the case with man is as certain as it is with other species. The idea once quite prevalent, even among leading biologists, that the same species could originate at different times and places has disappeared along with the conception of special creation upon which it was based, and the theoteleogical views that formerly prevailed. It is negatived by the admission of a phylogenetic connection with ancestral forms, since, under the infinitely varied conditions by which every new form is produced, the chances are infinity to one against the production of two identical species at different points. So much for the doctrine of polygenism which some anthropologists and sociologists have thought it necessary to revive and call in to explain certain phenomena presented by human races and human society. I shall endeavor to show that no such hypothesis is necessary.

Assuming, then, that man was developed upon some limited area presenting the conditions to the production of just such a being, we may gain a fairly clear conception of the nature of his early history. It must be remembered, however, that there does not now exist any race of men corresponding to the absolutely primitive type. The lowest races known to us are such as have for one reason or another remained for ages in an undeveloped state, but during all these ages they must of necessity have undergone profound modification. Many of them have fluctuated, having once belonged to far more developed types, and subsequently degenerated in adapting themselves to simpler or severer conditions of existence.

SOCIAL DIFFERENTIATION.

The fundamental character that distinguishes man from all other species of animals is his greater brain development and consequent increased powers of all kinds. The first mental faculty to tell in his history was memory. In all other animals blood-relationship is almost immediately forgotten. In man it is remembered, and this is the basis of the kinship group which is the natural foundation of society. The primary social cohesion is the consanguineal bond. The horde is at first only a family, and it never becomes anything more than a kinship group. The clan is only a larger kinship group rendered possible by higher mental powers and longer memory. Hordes and primitive clans, like animal cells, are limited in size, but not in growth, and the consequence in the one, as in the other case, is a multiplication by division. New hordes and clans are produced, and as these must each occupy different territorial areas, a process of expansion takes place. If the conditions of existence were everywhere the same, this expansion might take the form of a true circle, pushing out in concentric bands from the original center. But no such uniformity of conditions can be conceived of. The least diversity would suffice to give some trifling impetus to one radius in preference to another, and the form of the figure would begin to be irregular. In the actual state of things at any point on the earth's surface that anyone may please to select, the natural inequalities in the environment would at once produce great irregularities. The multiplying hordes would push out in only a few favored directions, would follow the water currents, string along the shores of seas or lakes, seek the nut-bearing forests and the bays abounding in shellfish, yielding to all the elements that promised an easier and more certain subsistence.

Another equally important mental faculty distinguishing man is cunning and inventive power. By means of this he was able to break over the faunal boundaries that limit the distribution of other species, and to overflow into other regions to which he was not originally adapted. All other species are restricted to special districts and unable to quit them. Every attempt to do so proves fatal to the individuals that make it. They find themselves in an environment to which they are not adapted and therefore hostile to them, and they quickly succumb to adverse influences. Any species that could successfully overstep its faunal barriers would, according to the now well-understood laws of multiplication, soon overspread the globe. That no species has done this proves the general law of faunal limitation. Man alone acquired this power, and this was the result of his superior resourcefulness, due in turn to his inventive faculty. For however feeble the inventive powers of primitive peoples may appear to the civilized man, they were greatly in excess of those of any other species of animal, and it required only a little exercise of reason to neutralize the most effective influences exerted by the environment in restricting migration. The ability to cope with the remaining fauna, to evade the attacks of predatory species, and to entrap and ensnare animal enemies, was alone almost sufficient for this. The least success in counteracting injurious climatic conditions, such as the most primitive forms of clothing and shelter insure, further conduced to the same end. The acquisition of an omnivorous character, such as belongs to all primitive races, rendered the food-supply certain, even before the introduction of any of the arts by which both the vegetable and animal kingdoms were early made to contribute to man's nourishment and comfort. The invention of the earliest weapons of the chase and the most primitive instruments for tilling the soil disarmed the hostile environment and converted the dangerous forces of nature into means of subsistence for man.

Thus emancipated from the slavery of the environment, this favored species commenced that career of universal expansion which ultimately compassed the entire globe. Although his memory was sufficient to establish the kinship group, this faculty was not sufficient to maintain a connection between the daughter-hordes and the ancestral horde from which they had descended, and a few removes were sufficient to obliterate all traces of relationship. Tradition, which has been aptly called social memory, did not yet exist, and those groups that had wandered farthest from the original center of dispersion were utter strangers to the mother-group. As they moved out along special and extremely irregular lines, in the manner already described, there were soon produced many such terminal groups, and these were usually remote from each other, often separated by seas or mountain chains.

The period during which this process was going on, however long it may have been, may be called the period of *social differentiation.* In it languages were formed, but, owing to gradual isolation, each group acquired a language of its own. At least the variation that would naturally take place in the language of any group would soon render it practically a different language from that of any of the remoter groups from which it had descended. *A fortiori* would the languages of all the terminal groups be different from one another. It would be the same with customs. The differences of environment would alone accomplish this, but customs naturally tend to vary, and unless there be intercommunication, they rapidly differentiate. The customs as well as the languages of all the different radiating lines would be utterly unlike except in certain fundamentals. When customs and ceremonials at length took the form of cults and religions, these, too, were different, and all the scattered groups ultimately presented the utmost heterogeneity in all their social characteristics. Between them the only points of agreement were biological. They still all belonged to the same genus and the same species, and were all equally men.

We have thus far pictured the scattered hordes as wholly isolated or only feebly joined to their ancestral groups along certain irregular lines by vanishing threads of memory and unorganized tradition. This would grow weaker and weaker as they receded from the primitive cradle, until everywhere on the remoter periphery all social connection would be lost. The different lines would be of very unequal length, and, as a matter of history, some of them reached out to the peopling of distant continents. All the social differences and certain physiological modifications due to differences of climate in the regions occupied, taken together, are what have finally produced the different races of men, and all the differences that exist among human races may be accounted for as the normal effects of social differentiation.

SOCIAL INTEGRATION.

Social differentiation forms the first chapter in the history of human society. The second chapter treats of social integration, and this is as far as it is proposed to go in this paper along this line. In a comparatively short time (and we are not at all limited in the matter of time) the number of human races was very great. These were all absolutely distinct sociologically, and many of them were wholly different ethnologically. They were alike only in their biological aspects. They were all *human* races. The number of races at a certain stage, viz., at the stage of maximum differentiation, was vastly greater than it is now, and greater than it was at any subsequent stage. This reduction in the number of human races was the result of social integration.

A drainage map of any great continent will show that the large streams that converge in their lower courses are made up of numerous smaller streams higher up, and that these are composed of great numbers of minor tributaries on the high plateaus. Many of these latter, when belonging to one of the great drainage systems, have their ultimate sources close to those belonging to the next adjacent system. Let us imagine two of those moniliform chains of human migration that I have described creeping slowly up two of these great drainage basins, the constrictions between the numerous bead-like links having in most cases so far deepened that all social and racial connection has been repeatedly severed. In both these lines the more remote groups, after reaching the highlands, have further ramified in partial correspondence with the topography, until groups are found in both far up among the ultimate sources of the smaller tributaries. In a tropical or subtropical region, such as that in which the human race could alone have had its origin, these high plateaus must be covered with dense forests. In the pursuit of game and other means of subsistence the more venturesome of these terminal groups could not fail occasionally to cross over the narrow divide that separated the head waters of the two great drainage systems. We may imagine two members of the two terminal groups that, under these natural conditions, chanced to occupy the opposite adjacent slopes accidentally to meet in the forest. What would be the result? If they should speak to each other, it would be in a language that neither could understand. There would arise in the breasts of both a mingled assemblage of crude savage feelings. Fear, wonder, hate, and rapacity would be among the blended emotions and motives to action. The result of such a first encounter would depend upon too many conditions to admit of prediction. But the repetition of such encounters, and especially the accidental meeting of bands from such different tribes, would lead to consequences that can be readily foreseen. When such encounters became frequent, as they could not fail ultimately to do, nothing could prevent hostility and war. Each group would look upon the other as something utterly foreign and unassimilable. There would be no "consciousness of kind." The possession of the human form might cause the existence of somewhat different sentiments from those aroused by encountering a tiger or a bear, but that there should arise any sentiment of *humanity* or any desire to cultivate closer relationships, is wholly out of the question. The combined effect of all the sentiments excited would be the desire to kill and destroy this new-found beast that could only be conceived as a natural enemy.

The more frequently such races were brought into contact, the more bitter would grow the animosity. The more they learned of each other, the more intense would be the mutual hatred. The first thing to strike each would be the utter dissimilarity, and everything that one race did or possessed that the other did not do or have would intensify the feeling of contempt. When it was found that not only were their languages different, but that their practices, customs, ceremonies, cults, and fetishes were all strange and unknown, the degree of mutual detestation would be without limit.

The period of social differentiation was a prolonged one. It saw the transition in man from a frugivorous to a largely carnivorous animal. The food-supply came to be in large part flesh, and all animals that could be ensnared or killed were eaten. Here was another large, dangerous, savage animal that must be killed whenever found, for the safety of the group. What more natural than that when captured and killed its flesh should be eaten, as was the practice with other animals! Such was the origin of cannibalism, a practice common to a certain stage in the development of every race of men whose history is known or can be traced back to that stage, and one which persisted in the Aryan race of Europe down to the time of Julius Cæsar. With the rapidly increasing frequency of encounters between races and the growth of a taste for human flesh (which is said to be the most highly flavored of all meats), the different races of men became the mutual game of one another, and man literally preyed upon man. This, of course, soon became a test of the relative strength of different races, and an era of universal warfare naturally supervened. How long this lasted during that great pre-historic antiquity of man can, of course, never be known; but when the curtain at last slowly rose over the world, it revealed a scene which is now commonly denominated the "struggle of races." I do not propose to enter here into a description of this great sociological process. This has been done by others, and I have unavoidably encountered and dealt with it in places where I could do it more justice than I could hope to do here. I shall therefore confine myself to pointing out the rôle that it has played in social integration.

The man-hunting and head-hunting stages have practically passed in the existing races of man, but history has revealed to us the social process that succeeded these and which has brought the world to its present state. The first stage was that of war and the measuring of the military strength of the races of men. This divided mankind into two great classes, the conquering races and the conquered races. Conquest was at first followed by the complete destruction and annihilation of the conquered races. This was succeeded by, first, the enslavement of the comely women of the conquered race, then by that of the soldiery, and finally by that of a large part of the subject race. At still later stages there arose between the conquering or ruling class and the subject or slave class an intermediate trading or mercantile class, which ultimately resolved itself into a general business or industrial class. Out of these three primary elements, which may be called the ectoderm, endoderm, and mesoderm, respectively, of the social tissues, have been formed what are now known as the "social classes" and the modern social body.

RACE INTEGRATION.

I dismiss this subject, the fundamental theme of sociology, with these few broad strokes, and shall devote the remainder of this paper to a few reflections on what may be regarded as the more especially ethnological aspect of social integration, viz., *race integration.*

Social differentiation, as we have seen, resulted in a practically unlimited number of races, all socially, and most of them ethnically, distinct. Social integration resulted in the amalgamation of these heterogeneous races into larger compound mixed races, and these became true races, greatly reducing the number of human races. The attempt to base any important conclusions, therefore, upon differences of race may be said to have utterly failed. All existing races are completely mixed. Some of the elements of which they are composed seem to be distinct and to point to stocks that were once pure, but could such stocks be anywhere found, they, too, would be equally compound and their elements would point back to earlier stocks. There is, however, no possibility now of finding a stock of which this is not true. Ages anterior to any human records—nay, ages before man had learned to make anything that archæologists recognize as a product of art, this process of race amalgamation had been many times repeated, and the races all inextricably blended. All that we see today and call races are simply a few of these composite groups that succeeded in holding together during a considerable period until certain common characteristics had been more or less definitely fixed. But even these race characters were the result of prior synthesis and are equally composite.

The great race distinctions marked by differences in the color of the skin and texture of the hair would seem to negative the possibility of a common origin. But a careful study of all the intermediate conditions shows that there are gradations between all such characters. These differences can all be accounted for by long exposure to different climatic conditions, by personal preferences and sexual selections arising therefrom, and by many other influences which are observed to act upon the physiological and biological elements entering into the problem. The one fundamental fact that all races, regardless of color, size, form, or any other differences, are perfectly fertile *inter se*, proves conclusively that the races of men all belong to one animal species, and this, under modern conceptions of the meaning of species, implies common descent and genetic filiation. It is inconceivable that two animal forms should, under the spontaneous formative influences of nature, be molded by the "fortuitous concourse of atoms" into such a condition of external and internal identity that when they should chance to meet through an equally fortuitous conjuncture they would recognize each other as belonging to a common "kind," and, uniting according to the laws of nature, would be able to originate a new race of beings. The mathematical law of probabilities, as well as the observed course of natural events, in every department of knowledge distinctly negatives such a violent assumption and supports the teachings of biology that man is everywhere the same.

But, as has already been remarked, the period of ethnic and social differentiation has now long passed, and that of ethnic and social integration has begun. Indeed, this latter process has been long going on. We are not sufficiently acquainted with any but the white races to be able to describe its effects, but they have doubtless been as marked in the yellow and even in the black races as in the white races. Here it has gone on through a long series of social assimilations until it has evolved a number of great amalgamated nationalities, such as the French, German, Italian, Spanish, Russian, and English peoples, all of which, though demonstrably composed of a great number of heterogeneous racial elements, are now compactly integrated into what may still be called distinct races. For under this view the term "race" loses all that definiteness with which it was formerly, and is still falsely, clothed, and comes to stand for any group of men who have, from whatever cause, acquired a certain community of characteristics which cement all the members of the group into a compact whole. There are other races in process of formation. There will soon be a distinct American race and an Australian race, a South African race and a South American race.

Some may be willing to admit this much, but still deny that integration is taking place between these so-called white races and the races of a different color. But even here the same law is in operation. Wherever races of different color are thrown together they tend to coalesce. However strenuously the superior races may resist this tendency, they can only diminish to a certain extent the rate at which it proceeds. They can never completely arrest it. It is well known that the Latin races freely combine with all the other races with which they come in contact. The Mexican is now a cross between a Spaniard and an Aztec. The Canadian "half-breeds" already constitute a race of French-Indians. All South and Central America is more or less mixed. The Teutonic races have somewhat successfully resisted the movement, but not wholly. The original Indian tribes of North America that have remained in the territory now occupied by the whites are now all thoroughly mixed. This makes no sensible impression upon the white population on account of their great numerical preponderance, but the Indians have become practically absorbed in the white population. Even in the larger reservations of the United States, wherever a considerable white population has made its way into the midst of the Indians, rapid race mixture is going on. This is exemplified in Indian Territory, where the two races have already become extensively blended.

A curious result has flowed from the law fixing annuities for the Indian population. The Indians are graded according to the amount of Indian blood in the veins of the recipients, and each person has a record showing this. This, on the one hand, puts a premium upon Indian blood, which would seem to work toward keeping the blood as pure as possible. But, on the other hand, it enhances the money value of Indian wives, and thus leads to the marriage of Indian women by white men. This purely sociological effect was probably not thought of by the framers of the law, and it is a fine illustration of how laws may have social effects not contemplated, but of a far-reaching character.

Great efforts are made to prevent the mixing of the white with the black races, but they are only partially successful. The effect of slavery is always to produce the mixture of the slaveholding and enslaved races. This was scarcely diminished in the United States by the fact that the slaves belonged to a black race, and before slavery was abolished there was a large mulatto population. The abolition of slavery has checked the process, but has not arrested it. The influence of caste, which relegates to the colored race all who have any black blood whatever, has the effect of including in that race many who are to all intents and purposes white, and whose intelligence is nearly equal to that of the white race. These persons also possess the other qualities of the dominant race. They become the leaders of the colored race, and by their influence and example help to lift them up. They are acquiring property which the laws are bound to protect, and in many communities they are the leading citizens. It is only a question of time, though the time may be long, when such facts will shatter the prejudices and break down the barriers of race.

As regards the yellow races, there seems to be less prospect of coalescence. Their enormous numbers keep them to themselves, and their great social dissimilarity from the white races renders contact distasteful. There may be districts in Asia where rapid mixture with Aryan and Semitic elements is taking place, but this is not the case in Europe or America. Still, the Japanese are now in high favor among western races, and should a movement set in in the direction of amalgamation, there would be no race prejudice to overcome. It is otherwise now with the Chinese, but they, too, may one day inhale the western spirit.

Whatever may be the present condition of things, and however great may be the obstacles to race mixture in certain cases, it is clear to those who contemplate the great future of mankind that race integration will go on until all the races of men shall be blended into one. Not that the lower races will overslaugh the higher ones, or that the latter will be dragged down to the level of the former The dominant races will always dominate the product, whatever it may be, but the less forceful elements will enter into it as modifiers. They represent qualities that in moderate proportions will improve and enrich the whole. The final great united world-race will be comparable to a composite photograph in which certain strong faces dominate the group, but in which may also be detected the softening influence of faces characterized by those refining moral qualities which reflect the soul rather than the intellect. This final perfected human race will therefore embody all that is great and good in man.

I am happily not alone in this view of the destiny of man. Others have expressed it, but no one more clearly than the eminent anthropologist Professor William H. Holmes, head of the Bureau of American Ethnology and of the Department of Anthropology of the United States National Museum. In his address as president of the Anthropological Society of Washington, delivered on February 11, 1902, entitled "A Sketch of the Origin, Development, and Probable Destiny of the Races of Men," after demonstrating by a series of admirably selected and arranged views of the principal types of mankind, and also of the three great simian types that most closely approach the human form, that man belongs to a single species, and that all human races resemble one another so closely as to constitute a practical unit from a biological point of view, he proceeded to work out the theoretical origin and divergence of the human races. His address contains many ingenious illustrations to this end, but I shall use only one of his figures with his explanation of it, as follows:

> I wish now to combine in a single diagram (K) a summary of my conception of the development of the species and the races from the period of specialization of the anthropoids up to the present time. The side lines in this diagram stand for the limits of the world within which the branching tree of the *Hominidæ* (A) springs up. The horizontal lines connecting across mark the periods by means of which we separate the stages of development.

The first period (I) is that which witnesses the specialization of the group of creatures (A) from which man sprang. It may be regarded as corresponding somewhat closely to the Tertiary period as formulated by geologists. We know not the exact number of closely related branches at that time, but it is held that the prospective human stem flourished and rose above the others. In the diagram the collateral branches B, C, D, E, are left undeveloped in order that *Homo* (A) may have a clear field—in order that we may illustrate more clearly the manner in which this group, according to our best interpretation, spread from its natal district and occupied the habitable world.

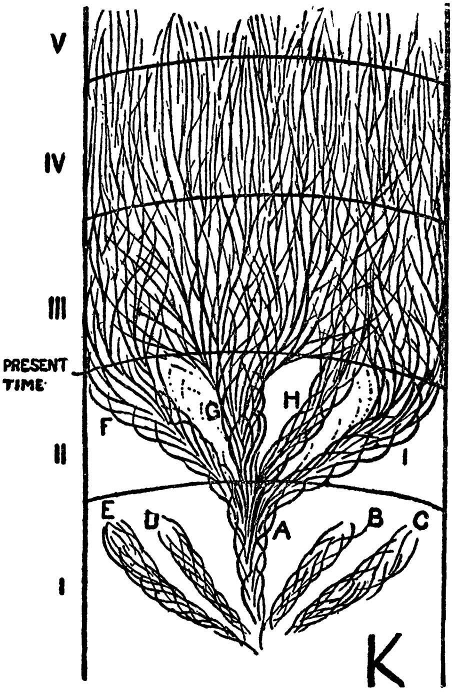

DIAGRAM K.—Showing origin of the genus *Homo* (A) in Tertiary time, separation into races through isolation in Post-Tertiary time (F, G, H, I), and theoretic blending of all forms in future time.

That the home of the human precursor was, at this stage of his development, restricted in area is assumed on reasonable grounds. The apes and monkeys of today, which are believed to correspond in grade of development to the human stock of the natal period, are not widely distributed, but occupy very restricted areas and such as are particularly suited to their arboreal habits and their rather delicate constitutions. There is no reason to believe that man at a corresponding stage was more hardy, more enterprising, or more widely scattered.

In the diagram, therefore, the stem A is made narrow below, widening upward, thus suggesting expansion of area with increase in numbers, energy, and intelligence. This expansion was, no doubt, very slow, and may or may not have extended to the farthest limits of the land area occupied, but it was prophetic of the greater expansions to be realized in period II. We cannot know in just what part of the world these events took place, just where the prehuman group was transmuted into the human. It may have been in Europe, Asia, Africa, Eurasia, Eurafrica, Lemuria, or America, but this does not matter here. We reach the conclusion that at or near the close of Tertiary time (period I) the change occurred and that upright, self-conscious man took his place permanently in the van of progress. We conceive further that, about this time, the continents assumed approximately their present dimensions and relations, and that this creature man, breaking over the barriers that formerly hedged him in, was ready to engage in their conquest. The simple, initial, integrate period of his career had now closed, and a period of marvelous expansion supervened (period II).

Spreading gradually into the various continental areas, the incipient human groups, as yet reasonably homogeneous in character, became widely separated. Some were quite completely isolated and went their separate ways, becoming sharply demarcated from the rest. Others less fully isolated continued to intermingle along the margins of the areas occupied, so that gradations of characters occur, and in some cases the resulting hybrid peoples have probably occupied separate areas long enough to become well-established varieties. Three or four groups only became so widely separated and fixed in physical characters that students are agreed to call them separate races, but these comprise the great body of mankind.

The line marking the close of period II stands for the present time, and F, G, H, and I are the races now in evidence. Let us consider what is happening along this line today. The end of the second period — the isolated specializing period — has come for the races, and changes of a momentous kind are being initiated. Man has spread out and occupied the world, and the resulting isolations and partial isolations on continent and island of peoples having meager artificial means of transportation, have brought about, directly or indirectly, the variations called races; but the period of group isolation and consequent race specialization is at an end. In the last few hundred years the sea-going ship and the railway have been invented, and the extremes of the world are no farther apart than were the opposite shores of a good-sized island when, a little while ago, all men went afoot. The period of differentiation is closed forever and the period of universal integration is upon us. We do not see how fast these movements are, but contrasted with the changes of earlier days they are as a hurricane compared with the morning zephyr. The continent of America has changed its inhabitants as in the twinkling of an eye, and Asia, Africa, Australia, and the islands of the Pacific are in the throes of race disintegration. Today each man may go two hundred and forty times around the world in his short lifetime. A single individual may be the parent of progeny in every important land area of the world; and this is only the beginning — the first few hundred years — of a period to which millions must be assigned. Then how shall we project the lines of the diagram into the future? There can be but one answer.

Very briefly we may outline the inevitable course of human history. In period III the races will fade out and disappear as the combined result of miscegenation and the blotting out of the weaker branches. The world will be filled to overflowing with a generalized race in which the dominating blood will be that of the race that today has the strongest claim physically and intellectually to take possession of all the resources of the land and the sea.

Blood and culture will be cosmopolitan. Man, occupying every available foot of land on the globe, will be a closer unit than he was on the day far back in period I, when, in a limited area hidden away in the broad expanse of some unidentified continent, the agencies of specialization first shaped up the species.[1]

A SOCIOLOGICAL UTOPIA.

Such a view may seem utopian, but it is only so in the same sense that every great epoch is utopian from the standpoint of those that preceded it. Life and mind are utopian when compared with a condition in which they do not exist, yet this cosmic step has been taken and an organic and psychic world evolved out of a lifeless and mindless world. Any of the highly developed types of life is utopian relatively to the lower types that preceded it: the seed plant to the spore plant, the cup-seeded to the naked-seeded plant, the backboned to the soft or shell-bearing animal, the mammal to the reptile, the lowest man to the highest ape, the civilized man to the savage. It would be utopian for an ape to aspire to manhood or for a troglodyte to picture the civilized state. It is only when we look backward and see how great the strides are that actually have been taken that we acquire a scientific conception of what evolution is capable of accomplishing.

Let us see what are some of the scientific elements in support of the utopia of ultimate universal race integration. This planet is believed to have supported some form of life during a period of something like 72,000,000 years. Half of this period was over before the forms of life that existed acquired sufficient material consistency to leave any recognizable impression in the thousands of feet of rock that was formed in that time, and we have scarcely more than graphite beds to prove that vegetable life in some perishable form existed. Doubtless this primitive flora was the food of equally frail and evanescent animal forms. One-third of the remainder, or 12,000,000 years, comprising the Cambrian and Silurian periods, was passed before vertebrated animals in the form of the oldest fishes and land plants of the spore-bearing types appeared. Another third, or 12,000,000 years more, rolled away before the faintest traces of mammalian life presented themselves well up in the New Red Sandstone or Triassic period, and during that and the next or Jurassic period, each of which lasted at least 3,000,000 years, the world was given over to amphibian and reptilian forms and to a cryptogamic and gymnospermous vegetation. It is only in the Cretaceous period succeeding the Jurassic, and occupying another 3,000,000 years, that anything like the now dominant forms of either plants or animals became common. At the close of the Cretaceous all but one twenty-fourth part of the earth's life-history had passed, and as yet there were no four-footed beasts such as make up the chief part of the present fauna of the globe. The Tertiary period was ushered in, estimated likewise at nearly 3,000,000 years, and it was during this comparatively brief space of time that all the great products of nature were evolved. Before it closed all the great families of animals, including the apes, were in existence. Whether man can be numbered among the products of late Tertiary (Pliocene) time is a question now under discussion, but the bulk of the evidence is in the negative. That is to say, it is generally conceded that the creature resembling man that has left relics of either his skeleton or his handiwork in the late Tertiary strata, was not really man, but the ancestor of man—Pithecanthropus, Homosimius, or whatever name may be given to it.

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[1] *American Anthropologist*, N. S., Vol. IV, No. 3 (July–September, 1902), pp. 387–90.

Man properly so called was of later or Quaternary origin. He came into existence somewhere below the terminal moraine, while the several glacial periods were successively chasing the arctic plants and animals from their north temperate homes and stranding them on the mountain tops of Europe. The duration of this period is variously estimated by geologists. Few place it higher than 500,000 years, and the consensus of opinion seems to vary from 200,000 to 300,000 years. It is therefore tolerably safe to say that the entire human period cannot exceed 300,000 years. But during at least seven-eighths of this period man was scarcely more than an animal. This was the period of social differentiation described at the beginning of this article. In it man overspread the globe, and he divided up into a multitude of races, but he achieved nothing. Human history at the most extreme calculation does not go back more than 25,000 years. This is also probably as far as archæologists can safely trace man's works, but it is only a span in the age of the earth. Forty such periods go into 1,000,000 years. It requires 120 of them to make a Tertiary period, and it is scarcely more than one three-thousandth part of the whole term of organic life. But of the real life-history of man less than half of this period can be counted, while practically all human achievement comes within one-fourth of it. Man is but a speck on the surface of the ocean of time as reckoned by geology.

Professor Haeckel in his *Welträthsel* happily characterizes this large view of the time-relations of organic life and of man as the "cosmological perspective," and illustrates it by looking upon the entire period of life on the earth as one great day (*Schöpfungs-Tag*), which is capable of being subdivided into the twenty-four hours of a solar day, the relative lengths of the several geological periods being expressed in hours, minutes, and seconds. One of his students worked out this conception and arrived at the startling result that the historic period, which he placed at 6,000 years, has occupied only five seconds of the creation day!

Haeckel estimates the age of the earth at 100,000,000 years, which is much longer than the estimate accepted by me in the above discussion, viz., 72,000,000, but this latter is even better adapted to the illustration given than was his because a multiple of twenty-four, and the results are still sufficiently striking. I have, however, thought that this might be made still more clear by projecting it upon a dial, and I have constructed one on this numerical basis. In this scheme 3,000,000 years represent one hour, 50,000 one minute, and 833⅓ one second. If we make the human period 300,000 years, man has existed six minutes of the cosmic day. If we make it 200,000, he has existed four minutes. If we allow the extreme length of 25,000 years for the historic period, it will represent thirty seconds. If we restrict it with Haeckel to 6,000 years, it occupies seven and one-fifth seconds. All of which is calculated both to teach humility and to inspire hope.

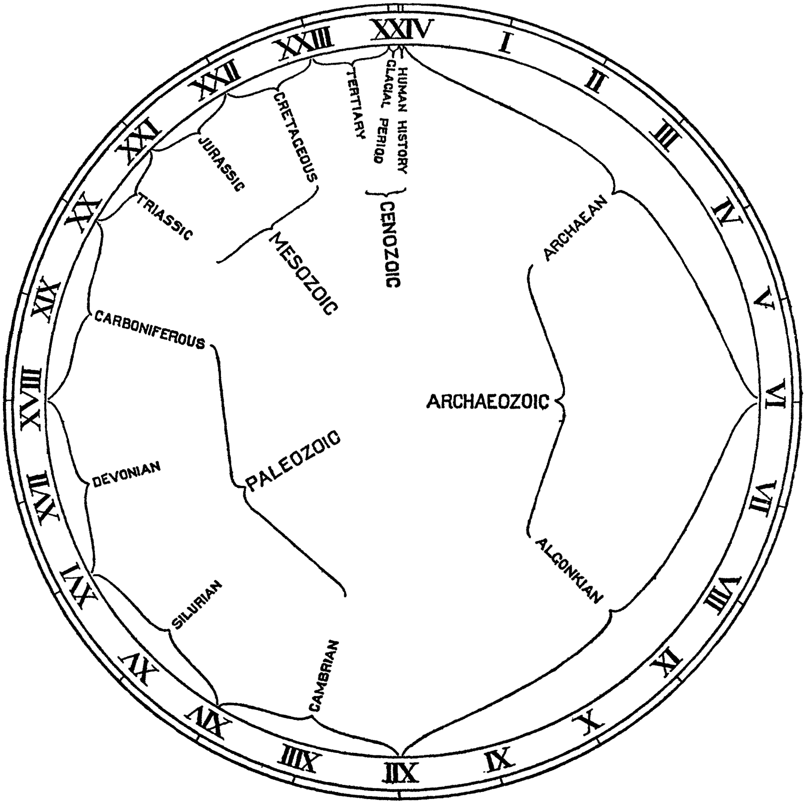
The following are the geological periods, expressed in years in the first column and in hours, minutes, and seconds of the creation day in the next three columns. The dial based on these figures follows:

Geologic Periods	Years	Hours	Minutes	Seconds
Archean	18,000,000	6	..	..
Algonkian	18,000,000	6	..	..
Cambrian	6,000,000	2	..	..
Silurian	6,000,000	2	..	..
Devonian	6,000,000	2	..	..
Carboniferous	6,000,000	2	..	..
Triassic	3,000,000	1	..	..
Jurassic	3,000,000	1	..	..
Cretaceous	3,000,000	1	..	..
Tertiary	2,675,000	..	53	30
Quaternary	300,000	..	6	..
Historic period	25,000	..	..	30
Total age of the earth	72,000,000	24	..	..
Age of written language	6,000			7⅕

But what is the bearing of all this upon the problem of race integration? Let us see. The period of differentiation could scarcely have been less than 150,000 years. That of integration is probably less than 50,000 years. In other words, social integration has only just begun. It must increase in rapidity with the increase of population. This rate will slowly diminish with density and increasing intelligence, but ultimately the whole world must become filled with men. Races will mingle more and more, and the more they mingle the more they will fuse. Slow as this process now seems to be, it is rapid compared with former periods, and it will become still more rapid.

But someone may say that it will require a long time to bring about the final racial unity of all mankind. True, but the question how long? is not the one under discussion. Time is relative. A million years is a short time compared with the age of the earth. Yet we can scarcely conceive of a million years—five hundred Christian eras! But the world is not going to come to an end in that time. Man is here. What is there to prevent his remaining here? This question gives rise to a train of others.

In the first place we are told that science points to the decline of the planet; that the sun is radiating its heat; that the conditions of organic existence are destined to deteriorate; that slowly but surely the capacity of the earth for sustaining life will diminish; and that man, almost without knowing it, will display



DIAL·OF·THE·COSMIC·DAY
~AGE·OF·THE·EARTH

less and less vigor until he grows imbecile and at last disappears along with all organic life, leaving the earth a dead star, comparable to our moon. This is all probably true, but let us see what practical interest it has for us.

It is mainly a question of temperature. No one will deny that during the historic period the temperature of the earth, though varying greatly in the different zones, has been upon the whole highly favorable to life in general. There is no reason to suppose that it was less so during the whole of Quaternary time, notwithstanding the occurrence in the northern hemisphere of several glacial periods. The Pliocene period that preceded this was perhaps more favorable to life than the early Quaternary, being more equable. The remainder of the Tertiary (Miocene and Eocene) was much warmer, so that vegetation now found at temperate latitudes grew above the arctic circle. Palms were common in the present temperate zone, and animal life was at its high tide. As we go back from the Tertiary through the Cretaceous to the Jurassic, we find evidence that the temperatures generally prevailing were too high to be favorable to the highest development of either plants or animals. We reach at last an almost exclusively coniferous and cycadean flora and a chiefly reptilian and amphibian fauna. When we reach the coal measures, the evidence all points to the existence of a very high temperature over the whole surface of the earth. There was very little difference between that of the equator and that of the poles. The same class of plants grew in Brazil and on Bear Island near Spitzbergen. It is altogether probable that the sun never shone upon the surface of the earth, but that from the almost seething waters there rose a vast atmosphere of vapor through which no ray of sunshine could ever penetrate.

We need not go farther back. It is obvious that none of the higher life of the present could have existed under these conditions. Aside from the necessity of vast periods of time to evolve these higher forms, the world was not ready for them until near the time when they appeared in late Mesozoic and Tertiary time. In a word, instead of there being a decline of life or a deterioration in the conditions necessary to the highest forms of organic existence, there has been a constant improvement in those conditions from the earliest geologic time to the present, and there is nothing to indicate that the optimum conditions have yet been reached. There is every probability that the habitability of the globe is still increasing and will continue to increase for countless ages. Should it at last reach its maximum, the duration of that golden age would be at least a million years, and it would probably be several million years before any decline would be perceptible. There is no reason to think that the period during which the conditions of vital existence will continue as favorable as they now are and have been since the beginning of Tertiary time will be less than that during which such conditions have now prevailed. That period, according to the estimates of the best-qualified authorities, is not less than three million years. All speculations, therefore, as to the ultimate decline of the planet, however scientifically sound, are purely theoretical and have no practical value whatever. So far as any practical interests are concerned, the world will *always* be what it is today.

A final objection remains to be met. We are told that all things have their rise, maturity, and decay, and that man cannot form an exception to this universal law. The bugbear of decadence now stares us in the face, and Nietzsches and Nordaus are sounding the warning note. First we are told that man in his egocentric myopia is exhausting the natural resources of the earth, destroying the forests, drying up the springs and rivers, and converting the green and smiling landscape into a desert of dry sand. The decline and fall of all the great empires of the past is another favorite theme, and the prediction is confidently made that the present leading nations are following the same path and must ultimately come to naught.

It is not easy to answer all this in a few words. So far, however, as concerns the exhaustion of natural resources, while the fact cannot be denied, still it requires but a glance at the history of the nineteenth century to perceive that man with the help of science has really increased the resources of nature a hundred fold and immeasurably enhanced the conditions of existence and enjoyment.

That nations rise, flourish, and decline is also true, but thus far at least no nation has gone down without another and greater rising at some other spot and carrying civilization forward beyond the point reached by the decadent race. The fall of empires is little more than the transplanting of civilization. It is social reproduction, and the universal condition to reproduction is decay. Social evolution is in this respect identical with organic evolution. The great types of animals and plants, as shown by their geological history, have similarly had their rise, culmination, and decline. But out of them have arisen new and more vigorous types that have successively carried forward the work of structural development until the present floras and faunas of the globe are far higher than those of any past epoch. Pteridophytes succeeded thallophytes, spermatophytes succeeded lepidophytes, angiosperms succeeded gymnosperms, and dicotyledons at last crowned the series of vegetal dynasties. Vertebrates succeeded trilobites and molluscs, amphibians succeeded fishes, reptiles succeeded batrachians, birds and mammals succeeded reptiles. Finally the higher mammals succeeded the lower, and man came last to crown the animal series. It is true that the lower types did not become extinct, but in almost every case, both in the vegetable and in the animal kingdom, the leading form of each type perished, and only the less specialized forms have come down to us. Witness among plants, the Lepidodendron, Sigillaria, and Calamites of the Carboniferous, the Bennettitean cycads of the Mesozoic; and among animals, the trilobites, the ganoid fishes, the dinosaurs, and the mammoth.

To maintain that because human races decline and degenerate the human species must also do so, is the same as to maintain that because many types of vegetation and of animal life have become extinct all plants and all animals must ultimately do so. The logic is unsound, and there is nothing to prove that not only life but also man may not continue indefinitely.

From any such standpoint as that from which we are now viewing the races of men the world appears to be in an infantile state. Europe and North America, where the highest civilization is found, form much less than half the globe, and the population of those areas is proportionally still less. By far the greater part of the earth has scarcely been touched with the spirit of science. That this influence is destined to spread over the whole earth is scarcely open to doubt. But the scientific achievements of the most advanced races, great as they may seem when compared with pre-scientific ages, are really trifling when looked at from the standpoint of possibilities.

Everyone has seen a map of the surface of the planet Mars with its wonderful canals. Schiaparelli was perfectly right in saying that they indicate the action of intelligent beings. The chief objection to this view is the gigantic scale on which these works are projected. It is said that man has never undertaken anything so colossal. The comparatively trifling task of cutting a channel large enough for ships to pass through the narrow Isthmus of Panama has well-nigh baffled his powers. What can be thought of a scheme of making a whole continent a network of great rivers many miles in width? Without pretending to any knowledge of areography, and without expressing any opinion as to the nature of the Martian canals, I will merely use this as an illustration of the possibilities of an intelligent being occupying a planet for a sufficiently prolonged period. If these canals really represent gigantic engineering operations, their magnitude is no obstacle to our understanding them. Mars, from his position in the solar system, is many million years older than the earth. Assuming that he has had an approximately parallel experience with that of the earth, his Tertiary period began ages earlier than ours. If the intelligent being, whatever its physical form, was developed there at the same relative date as man, that being has been in existence millions of years longer than man. The age of race differentiation need not have been longer than that of man. All the rest of that vast period has been passed in race integration and whatever followed this. We may suppose that an era of science was evolved there as here and at approximately the same stage in the history of the species. But that era has lasted thousands of times as long as has ours. Man has only just begun the conquest of nature. We may suppose that in Mars the conquest of nature is complete, and that every law and every force of nature has been discovered and utilized. Under such conditions there would seem to be scarcely any limit to the power of the being possessing this knowledge to transform the planet and adapt it to its needs.

The lesson is that man may also do this. With any considerable part of the time that the supposed inhabitants of Mars have had, man can scarcely fail to reach a stage at which he will become absolute master of his physical environment, and at which the operations which he now performs will seem like the work of ants. Just as he has now learned that in union is strength, and that the way of safety, success, and achievement lies through association, so he will then have learned that this is as true of races as of individuals, and that the union, association, and complete fusion of all races into one great homogeneous race—the race of man—is the final step in social evolution.[1]

LESTER F. WARD.

WASHINGTON, D. C.

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[1] This article was finished in its present form on September 19, 1902. On the 20th the following item appeared in many of the newspapers of the country:

"THE INHABITANTS OF MARS.

"In his recent expressions as to the habitability of the planet Mars, Professor Hough, of Northwestern University, has the weight of authority with him, though many astronomers will question seriously his bold declaration that the planet is actually inhabited with sentient beings of a high type. The whole tendency of recent investigation has been to strengthen the view that Mars both in its atmosphere and in its chemical character is fitted to support animal life.

"The point of interest in Professor Hough's announcement is the declaration that, as the law of evolution has resulted in the development of a sentient race on earth, that law, operating in the case of the Martians, must have produced there a race now greatly superior to the people of earth in intellectual development. Mars, Venus, and Mercury, he reasons, are old planets, and presumably habitable. Mars, being very much older than the earth, and having solidified and cooled long before the earth was fit for animal habitation, the process of evolution there presumably began much earlier. Judging from the published excerpts from Professor Hough's report, he is ready to believe that the Martians have advanced to a stage of cultivation and intelligence which is hardly conceivable to the minds of earthly races."

Struck by the coincidence both in the date and in the idea expressed, but wishing to be sure of its authenticity, I immediately wrote to Professor James, president of Northwestern University, who kindly turned my letter over to Professor Hough. In due course of mail I received a letter from him to the effect that what he had to say as to the habitability of other planets had not yet been put in shape for publication, and that the newspaper report was simply dictated to the reporter.